

SUPPLEMENTAL AMENDMENT

Serial Number: 09/897,320

Filing Date: June 29, 2002

Title: ELECTRONIC ASSEMBLY WITH SOLDERABLE HEAT SINK AND METHODS OF MANUFACTURE

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2. (Twice Amended) The electronic assembly of claim 1, wherein the at least one mounting pin is wave-soldered to attach the heat sink to the substrate and to preheat and couple the heat sink to the heat-producing component with the disposed thermal interface material [wherein the substrate further comprises:

at least one mounting hole to receive the at least one mounting pin, wherein the at least one mounting pin is disposed in the at least one mounting hole and wave-soldered to attach the heat sink to the substrate and to preheat and bond the heat sink to the heat-producing component with the disposed thermal interface material].

3. (Twice Amended) The electronic assembly of claim 1 [2], wherein the heat sink further comprises:

a thermally conductive plate, wherein the heat-producing component has front and back sides, the front side being disposed across from the back side, wherein the thermally conductive plate is coupled to the back side and the substrate is attached to the front side, and wherein the at least one mounting pin extends beyond the thermally conductive plate and the at least one mounting hole.

12. (Twice Amended) The electronic assembly of claim 1 [2], wherein the at least one mounting pin is disposed in the at least one mounting hole and wave-soldered during a pre-assembly operation.

13. (Twice Amended) A method comprising:

mounting a heat-producing component to a substrate having at least one hole therein;
positioning a layer of thermal interface material onto the heat-producing component;
aligning a heat sink including at least one mounting pin over the thermal interface material such that the thermal interface material is sandwiched between the heat-producing component and the heat sink, and further the at least one mounting pin is disposed over the substrate for soldering the at least one mounting pin to the substrate;

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reducing the viscosity of the thermal interface material by preheating the thermal interface material in a pre-heater of a wave soldering machine to cause the thermal interface material to wet the heat-producing component to thermally couple the heat sink to the heat-producing component; and

attaching the heat sink in a fixed position on the heat-producing component and the substrate by soldering the at least one mounting pin into the at least one hole of [onto] the substrate.

17. (Twice Amended) The method of claim 16, wherein soldering the at least one mounting pin [onto the substrate] comprises:

disposing the at least one mounting pin of the heat sink through the [a corresponding] at least one hole in the substrate; and

wave soldering the at least one mounting pin to the substrate.

Please add new claims 31-41 as follows:

31. A method comprising:

positioning a layer of thermal interface material on a heat sink having at least one mounting pin;

mounting a heat-producing component to a substrate having at least one hole therein; aligning the heat sink over the heat-producing component such that the thermal interface material is sandwiched between the heat-producing component and the heat sink, and further such that the at least one mounting pin is disposed for soldering to the substrate;

reducing the viscosity of the thermal interface material by preheating the thermal interface material in a pre-heater of a wave soldering machine to cause the thermal interface material to wet the heat-producing component to thermally couple the heat sink to the heat-producing component; and

attaching the heat sink in a fixed position on the heat-producing component and the substrate by soldering the at least one mounting pin into the at least one hole of the substrate.

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32. The method of 31, wherein reducing the viscosity of the thermal interface material comprises:
- loading the substrate including the heat-producing component, thermal interface material, and the heat sink onto a conveyor of the wave soldering machine; and
 - preheating the thermal interface material using the preheater to cause the thermal interface material to wet the heat-producing component.
33. The method of claim 32, further comprising:
- cooling the at least one mounting pin to mechanically fix the heat sink in place.
34. The method of claim 31, wherein soldering the at least one mounting pin comprises:
- disposing the at least one mounting pin of the heat sink through the at least one hole in the substrate; and
 - wave soldering the at least one mounting pin to the substrate.
35. The method of claim 31, further comprising:
- forming the heat sink including a thermally conductive plate such that the at least one mounting pin extends beyond the thermally conductive plate.
36. The method of claim 35, wherein forming the heat sink further comprises:
- forming a heat exchange portion such that the heat exchange portion extends beyond the thermally conductive plate and across from the heat-producing component.
37. The method of claim 36, wherein forming the heat exchange portion comprises:
- forming multiple fins extending away from the thermally conductive plate.
38. The method of claim 31 wherein, in aligning, the heat sink is made from a material selected from the group consisting of copper and aluminum.